

**Attachment 8** presents the Quality Assurance and Quality Control plan for the Sacramento Central Groundwater Authority Basin Management Objective Threshold Development and Recharge Mapping Project. This attachment describes the Quality Assurance and Quality Control plan and the measures that will be used in each task.

Quality Assurance and Quality Control (QA/QC) measures are built into each task and reinforced through the personnel qualifications.

#### **Task 1: Public Outreach**

The primary QC activities in Task 1 relate to the development of presentation materials to the Sacramento Central Groundwater Authority (SCGA) Board and the development of the project website. The presentation materials and website will be reviewed once by the consultant and a second time by SCGA staff. Necessary revisions will be made prior to presentation to the board or posting online.

Quality assurance is part of the intent of the public outreach activity as a whole. By presenting the methodologies and results to the SCGA Board and stakeholders at a series of meetings, these materials are reviewed by a wider audience, allowing for the incorporation of any needed changes in the project.

#### **Task 2: Groundwater Elevation BMO Threshold Development**

QC activities related to Task 2 focus on the methodology of the threshold development itself and on the extension of the groundwater model.

The threshold methodology will be QCed through review of the Central Sacramento County Groundwater Management Plan (CSCGMP) and coordination between SCGA staff and the consultant. Principal-level involvement during the steps of implementation will help provide a quality result, as will regular updates between consultant staff and SCGA staff.

The extension of the groundwater model will be QCed through the verification process in Subtask 3.4. This verification will include extending the Historical Calibration simulation period and incorporating land use changes and appropriate levels of groundwater production and surface water deliveries. The simulation results will be compared to an extended dataset of measured groundwater levels to verify the calibration.

As mentioned under Task 1, the presentation of the approach, interim results, and final results at SCGA Board meetings serve as a quality assurance measure to gain addition insight from stakeholders.

For the technical memorandum, reviewers, including at the principal-in-charge level, will be assigned at the beginning of the project to review the Task 2 technical memorandum.

The assignment will be entered into the consultant's enterprise project management system, which provides reminders to the reviewers and the project manager to ensure reviews take place. Hours and time are allotted for the reviews in the budget and schedule.

### **Task 3: Recharge Mapping**

Quality Control for the recharge mapping will focus on water quality sampling and analysis. The sampling will follow the guidelines of the well owner's standard procedures for water quality monitoring, which are based on Department of Public Health requirements and laboratory protocols. Sampling will be performed by agency staff familiar with the facilities under the supervision of consultant staff experienced with the requirements for the needed analyses. Sampling will include the collection of field blanks and duplicate samples (approximately ten percent of the total samples). Field blanks detect possible constituent sources contributed from sampling methods and equipment. Examples include, but are not limited to, improperly cleaned sampling equipment, persistent airborne constituents in the sampling environment, and constituent sources in the sample containers. Field duplicates monitor matrix consistency or heterogeneity, and variations attributed to lab analytical variability or constituent sources introduced in the laboratory, field, or sampling equipment.

The analytical laboratory will be selected so that it has all relevant certifications. The laboratory's QA/QC Program Manual will be reviewed to ensure that the lab is capable of producing accurate and reliable results. The results of the lab analysis will be reviewed by a senior geologist or engineer upon receipt to identify potential errors or omissions in the results. The analytical laboratory will use standard methodologies for their analyses: US Environmental Protection Agency (EPA) Method 300.0, 200.7, and 6010, and SM2320B, or equivalent. The specialized oxygen-18 and deuterium analyses will be performed at the well-regarded University of California Davis Stable Isotope Facility.

Similar to Task 2, reviewers, including at the principal-in-charge level, will be assigned at the beginning of the project to review the Task 3 technical memorandum. The assignment will be entered into the consultant's enterprise project management system, which provides reminders to the reviewers and the project manager to ensure reviews take place. Hours and time are allotted for the reviews in the budget and schedule.

### **Task 4: Project Management and Coordination**

The monthly progress reports, quarterly reports, and final reports will be reviewed prior to submittal to SCGA and DWR.

### **Task 5: Administration**

The quarterly reports, and final reports will be reviewed prior to submittal to DWR.

### **Personnel Qualifications**

The proposed project staff includes

- Jim Blanke, project manager, a registered California Professional Geologist and Certified Hydrogeologist with 10 years of experience working in Sacramento County groundwater issues.
- John Fio, an expert in stable isotope field sampling and analysis.
- Mesut Cayar, PhD, a registered California Professional Engineer and an experienced groundwater modeler who developed the Particle Tracking module for the SacIWRM.

- Reza Namvar, PhD, , a registered California Professional Engineer and an experienced groundwater modeler who was the lead modeler in the last update to the SacIWRM.
- Yamin Noor, an experienced IT professional responsible for the development of the HydroDMS and for the development of web pages to support groundwater management activities across the state.
- Ali Taghavi, PhD, principal-in-charge, a registered California Professional Engineer with 20 years of experience working in Sacramento County groundwater issues and who was a primary developer of the SacIWRM groundwater model.
- SCGA staff, including Darrell Eck, Ping Chen, and Ramon Roybal, have been with the agency since its inception and understand the technical and political underpinnings of completing a successful project.